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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

(Attorney Docket No. 03-1097)

In the Application of:	)	
	)	
N. Geoffrey Greenberg	)	**Before the Examiner**
	)	**Hurley, Shaun R.**
Serial No. 10/759,586	)	
	)	**Group Art Unit:**
Filed: January 15, 2004	)	**3765**
	)	
For: SEWING THREAD	)	

BRIEF ON APPEAL

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BRIEF ON APPEAL

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

APPEAL BRIEF

Dear Sir:

This Appeal Brief is submitted pursuant to 37 C.F.R. § 41.37, based on the Notice of Appeal filed on May 23, 2006. A petition for a one-month extension of time is submitted herewith with the appropriate fee. The Patent Office is authorized to charge all fees to Deposit Account No. 13-2490.

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Table of Contents

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I. Real Party in Interest

The real party in interest is American & Efird, Inc., to which this invention is assigned.

II. Related Appeals and Interferences

Applicant is not aware of any related appeals or interferences.

III. Status of Claims

Claims 1-3, and 7-14 stand finally rejected. Claims 4-6 and 15-20 have been cancelled. A clean set of these claims is set forth in Appendix A.

IV. Status of Amendments

There are no outstanding amendments.

V. Summary of Claimed Subject Matter

Presently pending is one independent claim: claim 1.

Claims 1 is directed to an improved 2-ply sewing thread composition characterized by a high degree of twist which is imparted to at least one spun yarn containing 100% staple fibers, where the twist of the spun yarn is equal to or greater than 4 turns per inch than that of the plied twisted composite and is twisted in the opposite direction of the twisted composite.

Various types of sewing threads and the methods of making them are well known in the art. Typically, sewing threads fall into four types; (1) spun threads, (2) core threads, (3) continuous filament threads, and (4) air entangled threads. This invention relates primarily to the first type, spun threads. In general, all sewing threads are formed from a combination of individual yarns and these yarns are manufactured in differing ways and composed of differing materials. Spun threads are characterized in that the individual yarns or singles are fabricated from small pieces of staple through a drafting and twisting process commonly known as

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spinning. The staple fiber is typically composed of natural fibers or small pieces of synthetic filaments less than 2 inches in length.

One advantage of spun threads over core or entangled sewing threads, from a manufacturing or raw material cost point of view, is that spun threads are the least expensive of the three types of threads to manufacture because the cost of staple fiber is much less expensive than that of continuous filaments. However, from a performance point of view, i.e., sewability and durability, spun threads are less desirable than threads containing continuous core filaments. The differences are more evident during heaving sewing applications and/or when the thread undergoes abrasive treatment such as occurs in the commercial stone washing of denim jeans. In these environments, spun thread has a tendency to fray or break and generally does not perform as well as threads where the individual yarns or singles contain a continuous filament core. Accordingly, there exists a need to develop an improved spun thread that contains the less expensive staple but exhibits performance greater than conventional spun thread and more preferably approaches or equals that of core thread. The sewing thread of this invention fulfills this need by imparting a high twist to the individual spun yarns, which is contrary to established manufacturing doctrine, so as to produce a ply twisted composite thread having two yarns, where at least one single yarn is composed of 100% staple fiber. More specifically, the invention requires that at least one spun yarn has a twist imported to it before combined with the second yarn (which may or may not be a spun yarn). That twist is equal to or greater than 4 tpi compared to the tpi of the twisted composite, which has a twist in the opposite direction of the single twisted spun yarn. Such an improved spun thread exhibits performance almost equal to that of a conventional core type sewing thread.

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VI. Grounds of Rejection to be Reviewed on Appeal

Claims 1-3 and 7-14 stand rejected under 35 U.S.C. § 103(a) as being obvious over Hatch in view of Smith et al.

VII. Argument

A. The Examiner Erred in Rejecting Claims 1-3 and 7-14 under 35 U.S.C. § 103 as being Obvious

In order to establish a *prima facie* case of obviousness over a combination of references, the combination must teach or suggest all of the claim limitations. M.P.E.P. § 2143; *In re Royka*, 490 F.2d 981 (CCPA 1974). Applicant believes that the Examiner may have inadvertently misconstrued the teachings of the Smith reference and thus incorrectly concluded he established a *prima facie* case of obviousness.

In responding to Applicant's response to the first substantive Office Action, the Examiner stated that Applicant's "basic argument" is that the combination of the Hatch and Smith refernces are nonanalagous art. Although Applicant believes that it is improper to combine Smith with Hatch, this was not Applicant's main argument. The more important argument was that a *prima facie* case of obviousness can not be maintained because the two cited references simply do not teach all of the claimed elements of Applicant's invention. This was clearly set forth in Applicant's response to the first substantive Office Action. Below is a summary of the claimed elements that are ***missing,*** even if it is assumed that the combination of the references is proper:

1) that the ***plied*** composite has less twist than at least the one spun yarn. (claims 1-3 and 7-14)

2) that the at least one spun yarn has a single twist of at least 4 turns per inch ***more*** than the level of twist imparted in the opposite direction to the plied composite. (claims 1-3 and 7-14)

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3) that the at least one spun yarn has a single twist of at least 6 turns per inch ***more*** than the twist imparted in the opposite direction to the plied composite. (claim 2)

Although Hatch teaches that the individual yarns that are eventually plied together are twisted, both the Applicant and Examiner agree that Hatch does ***not*** mention any level or degree of twist of these individual yarns and, more importantly, does ***not*** mention any level of twist of the plied composite. Moreover, it appears that the Examiner apparently overlooked the fact that Hatch actually teaches that a plied composite of individual twisted yarns should be "***balanced***."

> **Balanced twist in the plied and cabled yarn 'is the arrangement of twist which will not cause twisting on itself when the yarn or cord is held in the form of an open loop.'**

(see Hatch pg. 294, col. 1, 4th para.) Thus, Hatch teaches that there should be no significant difference between the turns per inch ("tpi") of individual yarns and the tpi in the opposite direction of the plied composite. Indeed, Hatch teaches the ***exact opposite*** of what Applicant is claiming. Each of Applicant's claims requires that the at least one spun yarn has a greater twist than the plied composite. This is not the "balanced" twist that is taught by Hatch.

The secondary reference, Smith, does ***not*** supply what is missing from Hatch. Indeed, just the opposite. Smith is completely consistent with Hatch in teaching that the level of twist of the plied composite should be "twisted together at the same number of turns per inch" in the opposite direction.

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> **[0029] FIG. 2B** shows an enlarged perspective view of a different embodiment of one strand **7** in the inner layer, and shows one of the pre-twisted substrands **19** in greater detail. In **FIG. 2B**, strand **7** is constructed from three pre-twisted substrands **19**. Each substrand **19** is formed as follows. Three yarns **20** are individually formed from a multiplicity of continuous filaments **21**. Each yarn **20** is twisted about its longitudinal axis at between 1 and 6 turns per inch (tpi), and preferably between 2 and 4 tpi, in a counterclockwise direction (denoted by the smaller arrow). The three twisted yarns **20** are then twisted together at the same number of turns per inch in a clockwise direction (denoted by the larger arrow). Alternatively, substrands **19** can be formed in a single twisting step by twisting together all yarns in the substrand in a clockwise direction at between 1 and 6 tpi, and preferably between 2 and 4 tpi. The amount of turns per inch in the twisting will vary proportionately smaller or larger depending on the diameter of the particular yarns, substrands, and strands being constructed. In the lower portion of **FIG. 2B**, the three substrands **19** are shown in cylindrical outline (for example, as more clearly shown in **FIG. 2A**). However, all three substrands in this embodiment are formed in the same manner, that is, by the twisting of multifilament yarns, and there is no sheathing of any of the substrands **19**.

(see Smith, para. 29). The Examiner has has indicated that Smith teaches a twist greater than 4 tpi, up to 6 tpi. This teaching, however, does not support the Examiner's contention that Smith supplies the missing element absent in Hatch, that being that the composite or plied structure ***must*** have a twist of 4 tpi or less than the individual at least one spun yarn. While it is absolutely true that Smith teaches that ***individual*** yarns that make up the composite should have a level of twist between 1 and 6 tpi, Smith says absolutely nothing about having the composite twisted ***less*** than the individual yarns making up the composite. Or, stated differently, Smith is completely silent that the individual yarns making the composite can have higher levels of twist than the composite.

Each and every claim of Applicant's invention requires that the composite have a level of twist at 4 tpi or ***less*** than the at least one spun yarn. Smith, like Hatch, teaches the exact

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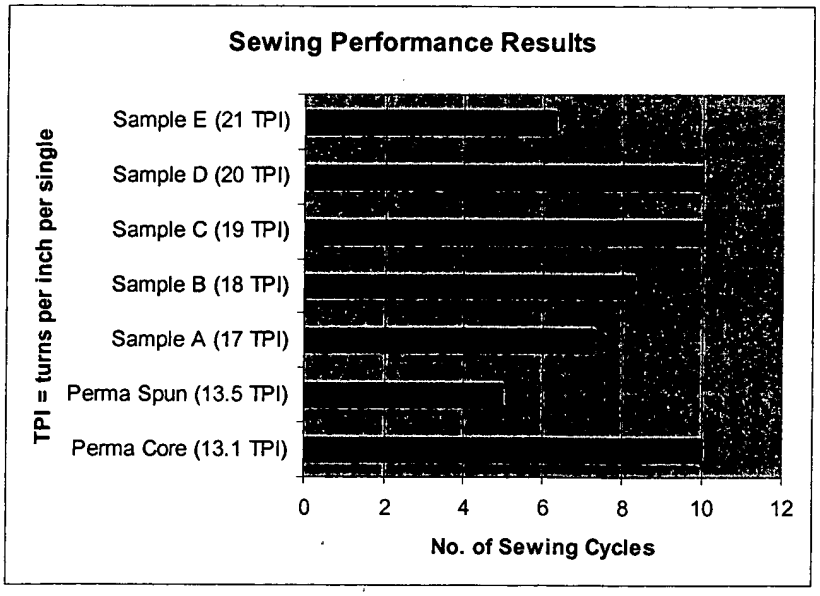
opposite. As clearly stated in paragraph 29 of Smith, reproduced above, the 1 to 6 tpi level of twist is ***only*** directed to the individual yarns **20** in the "counterclockwise" direction. "The three twisted yarns **20** are then twisted together ***at the same number of turns per inch in a clockwise direction***." (see Smith para. 29) Thus, Smith teaches that the composite should have the same number of tpi as the individual yarns, not less. Like Hatch, this necessarily results in a balanced twist of the composite. For these reasons alone Applicant submits that the combination of Hatch and Smith do not teach each and every element of the claimed invention and thus a *prima facie* case of obviousness has ***not*** been established. As such, Applicant respectfully requests this rejection be withdrawn.

The Examiner has also stated that Applicant has not shown unexpected results. Applicant respectfully disagrees. The bar graph on page 13 of the originally filed patent specification (reproduced below) shows unexpected results.



This graph clearly illustrates that sewing performance for a sewing thread made from highly twisted spun yarn singles (Samples C & D) perform equally to commercially available sewing

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thread made from continous filament yarns (Perma Core). And, sewing thread made according to the claims of the invention out perform commercially available sewing thread made with low twist spun yarn (Perma Spun). Perma Spun sewing thread is used as the basis of comparison to the claimed inventions and comprises 3 strands of spun yarn containing 100% stable fibers, with each individual yarn twisted 13.5 tpi in the S direction and having the plied composite twisted 10.74 tpi in the Z direction. Thus, the individual strands have only about 3 tpi greater twist than the composite. The bar graph clearly demonstrates unexpected results for sewing thread samples A, B, C and D, which had levels of twist of the individual yarns that were 5, 6, 7 and 8 tpi, respectively, ***greater*** than the plied composites, which was twisted 12 tpi. The sewing performance of the claimed sewing threads exceeded the Perma Spun and increased until a single twist level of 21 tpi was reached (Sample E). At 19 and 20 tpi (Samples C and D) the high twist spun yarn sewing thread of the present invention matched the sewing performance of Perma Core sewing thread made using a continuous filament core yarn (i.e., non-staple fibers). Therefore, it is possible to match the performace of a continuous filament yarn using spun yarns if the the level of twisted is manipulated according to the Applicant's invention. This is clearly an unexpected result.

Applicant also maintains its secondary argument that one skilled in the art developing and manufacturing ***sewing thread*** would not look to a reference directed to ***elevator rope***. First, the Smith reference is completely silent with regard to sewing thread and yarns made with 100% staple fibers. In fact, Smith only teaches the use of synthetic continuous filament yarns and does not mention using yarns composed of 100% staple fibers. (See Smith, para. 11). Each of Applicant's claims requires at least one spun yarn comprising 100% staple fibers. In addition, Smith teaches a maximum twist level of only 6 tpi. Thus, the combination of Smith with Hatch

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is improper and provides an independent basis why the rejection should be withdrawn.

Thus, in summary, the Examiner has not established a *prima facie* case of obviousness with respect to any of the presently pending claims, making the obviousness rejections in error as a matter of law. Applicant therefore respectfully requests that the Board overturn these rejections.

B. Conclusion

Applicant has demonstrated that the Examiner's rejections of claims 1-3 and 7-14 are in error as a matter of law. Applicant therefore requests reversal of the rejections, and allowance of all pending claims in the application.

Respectfully submitted,

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Dated: 8/23/06

By: _____

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APPENDIX A

PENDING CLAIMS

1. (previously amended) A 2-ply sewing thread comprising, in combination, at least one spun yarn ply twisted together with a second yarn in a first direction about each other along a common axis to form a ply twisted composite yarn, where the spun yarn contains 100% staple fibers, has a single twist equal to or greater than 4 more turns per inch than that of the plied twisted composite yarn, and is twisted in the opposite direction of the ply twisted composite yarn.

2. (previously amended) The sewing thread of claim 1 further characterized in that each spun yarn has a twist that is equal to or greater than 6 more turns per inch than that of the ply twisted composite yarn.

3. (original) The sewing thread of claim 1 further characterized in that the second yarn is a spun yarn.

4. (cancelled)

5. (cancelled)

6. (cancelled)

7. (original) The sewing thread of claim 1 further characterized in that at least a portion of the staple fiber is a synthetic material.

8. (original) The sewing thread of claim 1 further characterized in that the staple fiber is composed of one or more synthetic polymers.

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9. (original) The sewing thread of claim 1 further characterized in that the staple fiber is selected from the group consisting of wool, cotton, nylon, polyester, rayon, polyethylene, polypropylene, aramid, meta-aramid and mixtures thereof.

10. (original) The sewing thread of claim 1 further characterized in that the staple fiber is polyester.

11. (original) The sewing thread of claim 1 further characterized in that the staple fiber is composed of staple that averages less than about 2 inches in length.

12. (original) The sewing thread of claim 1 further characterized in that the staple fiber is composed of staple less than about 1.5 denier/filament.

13. (original) The sewing thread of claim 1 further characterized in that the ply twisted composite yarn has a twist equal to at no more than 4 turns per inch less than the twist of the individual spun yarns.

14. (original) The sewing thread of claim 1 where the individual spun yarns, prior to being plied, have a tensile strength that is less than the tensile strength of the ply twisted composite yarn.

15. (cancelled)

16. (cancelled)

17. (cancelled)

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18. (cancelled)

19. (cancelled)

20. (cancelled)

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